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L12: Entry 1 of 1

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TITLE: Remote computer communication

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Detailed Description Text (41):

Service providers that execute on management server 334 include an access service provider 720. Access service provider 720 accesses a master client database 722 and corporate database 774. Access modules, such as access 712, access 622 on tunnel server 332, or access 550 on remote computer 100, communicate with access service provider 720 in order to retrieve data in master client database 722 and to store and retrieve data in corporate database 774. Master client database 722 includes data needed to select a lowest cost connection path from a remote computer 100.

Detailed Description Text (47):

Referring to the flowchart in FIG. 8, and to the software modules shown in FIG. 5, operation of automation server 510, which executes on remote computer 100, follows a sequence of steps when attempting to establish a connection path for a user. First, the automation server accepts the username and password of the user through user interface 512 (step 800). Automation server 510 provides this username and password, an example of "credentials" for the user, to authorization 570, along with an identifying number, or "cookie", for that user (step 810). Authorization 510 records this association of a cookie and credentials in a credential cache stored in working memory on the remote computer. The cookie is passed along with each request to other modules to identify the particular connection for which the request is being made. Automation server 510 passes the username and cookie to access 550. Access 550 provides, in return, user-specific information for that user (step 820). Access 550 retrieves the user-specific information from a local database 552, which contains a portion of the data stored in master client database 722 (FIG. 7) stored on management server 334 (FIG. 3). Automation server 510 uses the user-specific information, for instance, to provide defined choices in the "calling from" and "calling to" fields in the dialog box shown in FIG. 2(b). After automation server 510 receives the "calling from" and "calling to" information from the user (step 830), it passes this information to access 550 which, after computing the costs of various possible connection paths, provides a list of connection paths to automation server 510 sorted by increasing cost (step 840). Automation server 510 provides the sorted list of connection paths to connect library 520 and requests that a connection be established using one of the paths (step 850). If connect library 520 successfully makes a connection (step 870), automation server 510 enters a mode in which it monitors the connection (step 880) waiting, for instance, for the possibility that the connection is unexpectedly terminated. If no connection can be established, automation server 510 notifies the user (step 890).

Detailed Description Text (48):

Referring now to the flowchart in FIG. 9, when access 550 accepts the area code and exchange (NPA/NXX) of the "calling from" field from automation server 510 (step 900), it executes a series of steps to determine the sorted list of connection paths to return to the automation server. First, access 550 determines whether it has all of the necessary information, including an NPA table for the specified area code, stored in local database 552 for that area code (step 910). If it does, it accesses

that information and extracts the records associated with the specified exchange (step 920). These records identify the local telephone connections to POPs or remote access servers the user can make from his location. Access 550 then appends records identifying toll-free telephone connections to POPs or remote access to this list (step 930). Each of the local and toll-free records includes performance and monetary cost factors for both the particular POP or access server associated with a connection, as well as for the ISP that operates that POP. Access 550 aggregates and combines these factors in a user-specific manner. It next retrieves user-specific weights for these factors from local database 552 (step 940). Access 550 next aggregates the ISP and POP factors according to the user-specific weights (step 950) and then combines the aggregated monetary and performance factors to determine a single numeric cost for each connect path (step 960). Access 550 then sorts the list of connection paths (step 970) and returns the sorted list to automation server 510.

Detailed Description Text (95):

Prescriber scripts make use of extensions to the tcl language, in the form of built-in functions, that are used to interact with other software modules on the remote computer. A function is provided to determine the serial (COMM) port corresponding the a RAS entries. Functions are provided to open, close, write to, and read from, a modem attached to a specified serial port. A function is provided to initiate a reboot process. This function stores information in non-volatile memory that is used by the prescriber after the reboot is complete to determine that it itself initiated the reboot process, and that it should invoke the top level reboot script. A function is also provided to communicate with access 550 to access local database 552 or data stored on the management server. Another function is used to communicate with call home 546 and file transfer 547. This function includes the option of communicating with a reference modem at the management server to verify the proper functioning of the local modem, as well as the option to retrieve files or configuration parameters from the management server.

Detailed Description Text (125):

Connect library 520 then begins making a connection to POP 320. Connect library 520 retrieves the user's credentials from authorization 570 (step 6) and provides the credentials to RAS/DUN 530 (step 7) which uses these credentials to establish a PPP connection to POP 320 (step 8). RAS/DUN 530 can use a variety of authentication protocols with POP 320. One common protocol the Challenge Handshake Authentication Protocol (CHAP). The basic exchange between RAS/DUN 530 and POP 320 is that RAS/DUN 530 provides a username A, POP 320 then replies with a random number N, and RAS/DUN 530 replies to the challenge with a hash function of a secret password and the random number. Therefore if POP 320 holds the user's password, it can authenticate the user by comparing the response to the challenge to its own computation of the hash function of the password and the random number.

CLAIMS:

1. Software stored on a computer readable medium for causing a remote computer to perform the functions of:

accepting a dialing database, including telephone access numbers;

accepting an identification of a computing resource; and

establishing a data communication path to the computing resource including

determining a plurality of access paths for communicating between the remote computer and the computing resource, including retrieving information related to the identified computing resource from the dialing database,

determining a cost for each of said plurality of access paths, including evaluating a cost function for each of said plurality of access paths,

selecting a first of the access paths based on the cost for each of the access paths, and

initiating establishment of communication over the selected first of the access paths.

17. The software of claim 1 further causing the remote computer to perform the functions of:

accepting credentials from a user of the remote computer, the credentials including an identification of the remote user;

authenticating the user by using the credentials and an authentication service on another computer; and

establishing a management communication path to the other computer and accepting information including information for a dialing database over the management communication path;

wherein determining the plurality of access paths for communicating between the remote computer and the computing resource includes retrieving information related to the identification of the remote user from the dialing database.

19. A method for data communication comprising:

accepting a dialing database, including telephone access numbers;

accepting an identification of the computing resource; and

establish a data communication path from a remote computer to a computing resource including

determining a plurality of access paths for communicating between the remote computer and the computing resource, including retrieving information related to the identified computing resource from the dialing database,

determining a cost for each of said access paths, including evaluating a cost function for each of said access paths,

selecting a first of the access paths based on the cost for each of the access paths, and

initiating establishment of communication over the selected access path.

35. The method of claim 19 further comprising:

accepting credentials from a user of the remote computer, the credentials including an identification of the remote user;

authenticating the user by using the credentials and an authentication service on another computer; and

establishing a management communication path to the other computer and accepting information including information for a dialing database over the management communication path;

wherein determining the plurality of access paths for communicating between the remote computer and the computing resource includes retrieving information related to the identification of the remote user from the dialing database.